Model/Atlas of Normal Human Lung

HL-064368: EA Hoffman PI

Academic Partners:
U Iowa, Johns Hopkins, Marquette University, Mayo Clinic, U Texas, U Wash, U Auckland,
Industry Partners: Siemens Medical, Amersham (GE Healthcare), Aventis, Olympus

JHU

MU

Mayo
UT

UW
U Auck

HL-064368: Highlights

•Our BRP has lead to the opening of the *Iowa-Comprehensive Lung Imaging Center (I-Clic)* in March 2004.

•Established a *Large Image Microscope Array* (LIMA) for CT correlation.

•*MIFAR*, an open source image database environment; http://dpi.radiology.uiowa.edu/mifar/index.php

•Established *Multiple Inert Gas Elimination Technique and fluorescent microsphere maps* of flow and ventilation for cross validation against CT functional imaging.

•Lung imaging and image analysis extended to *micro CT* for drug discovery.

•We have published over *60 papers and 45 abstracts*. An overview paper of our work was featured recently in Academic Radiology. [Hoffman et al. Academic Radiology; 2003: 10(10): 1104-1118]

•Two papers derived from BRP have won the Association of University Radiologist's Herbert M. Stauffer, *Outstanding Basic Science Papers for the years 2002 and 2003*.

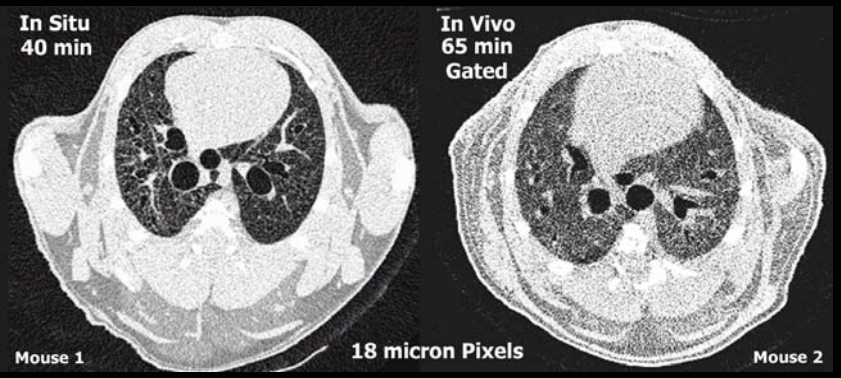
•We are currently utilizing newly developed methods for *lung, lobe, airway and vascular segmentation, anatomic labeling, image matching, texture characterization, blood flow and ventilation analysis* to populate our growing *atlas of the normal human lung*.

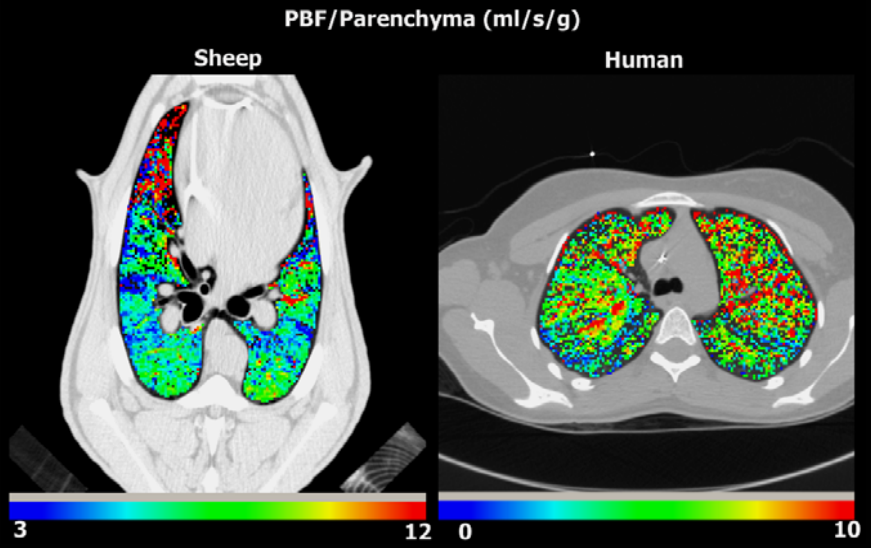
•Our BRP derived image analysis software was used in the recently completed National Emphysema Treatment Trial (*NETT*), and the objective computer-based measures were able to provide *highly significant predictions of* subject specific *probability of positive surgical outcomes and a subgroup with significantly reduced mortality* relative to the non-surgical group.

•Technology supporting *5 new grants*

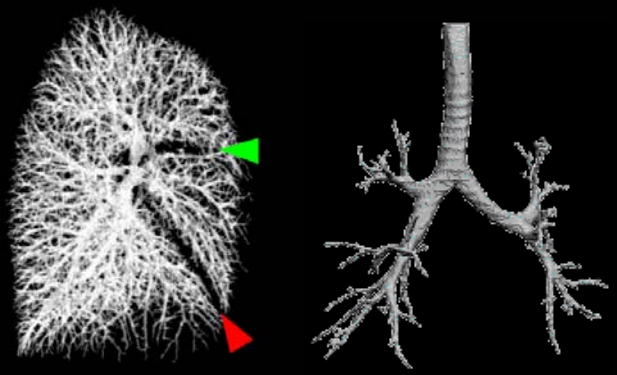
HL-064368 : New in 2004

Extension to Micro CT: Mouse Atlas
With Wolfgang Recheis

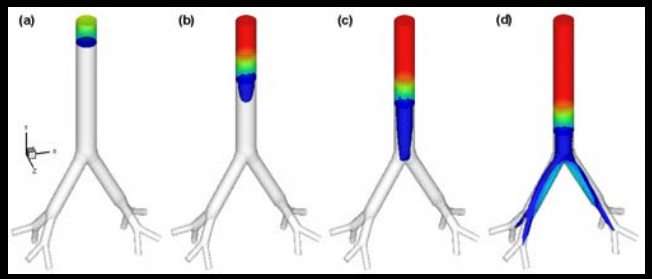




Structure-Function Correlates of CT-based measures of perfusion and ventilation: Sheep (left) vs Human (right)

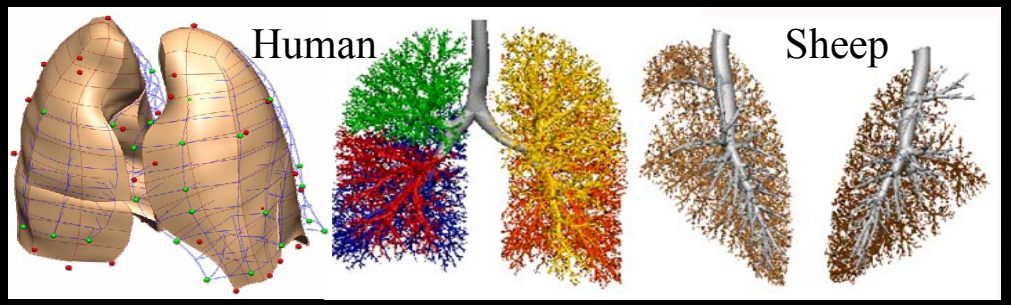


Segmented
Vascular and Airway Tree
With Hidenori Shikata, Milan Sonka, Joseph Reinhardt



CFD Model of
Xenon
Win / Wout

With Ching-long Lin



Human and Sheep Lung Model extended from CT Data
With Merryn Tawhai and Peter Hunter